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**DOE OVERSIGHT BUREAU**  
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DEPUTY SECRETARY

30 April 1997

Beth Oms, POC  
U.S. Department of Energy  
Kirtland Area Office  
P.O. Box 5400  
Albuquerque, NM 87185-5400

**Re: DOE OB's Final Suggested Background Values for the KAFB Area  
(Except Metals in Soils)**

Dear Ms Oms:

This provides an update on the status of determining background values for various constituents of concern at KAFB. This information is provided as technical comment, not the regulatory position of the New Mexico Environment Department.

You may recall that in the tables with our review comments for SNL's Background Study (Ron Kern's 20 Feb letter) some numbers were given in bold type. We did this to indicate constituents for which we recommended a lower background value than did SNL. By now we have had meetings with SNL on these differences with several results:

1. Consensus was reached on all values over which there was disagreement, except those in our original Table 5 (metals in soils).

Therefore, please replace the copies of Tables 1-4 and 6 originally included in our review comments with those enclosed (giving DOE OB/SNL consensus values).

2. As no consensus was possible on values suggested in Table 5 (which addressed Appendix C of SNL's Background Study), it was mutually agreed that:

a) SNL would withdraw Appendix C from their Background Study report and advise HRMB to disregard it.

b) SNL would determine new background values for metals in soils, focusing on the Canyons area.

c) This will be based on a new data set, consisting of selected SNL and DOE OB results as well as new SNL soil analyses for the area.

KAFB1854



d) Background values for soils, to replace those originally reported in Appendix C, will be submitted to HRMB by SNL.

e) DOE OB personnel will have input at various stages of the process.

As soon as SNL's replacement background values for metals in soils are available, we will provide, through normal channels, review comments on it as well as a replacement Table 5.

If there are any questions, please call me at 845-4103.

Sincerely,

A handwritten signature in cursive script that reads "W. J. Stone".

William J. Stone, Ph.D.  
Acting POC

Enclosure

cc: John Parker, NMED, Chief, DOE OB  
Benito Garcia, NMED, Chief, HRMB  
Warren Cox, SNL, Manager, ER Project

**Table 1**  
**Chemical Constituents in Soil**

COC (Depth) Area Group <sup>(1)</sup>	SNL Median  (mg/kg)	SNL 95th Percentile or UTL  (mg/kg)	DOE OB Median  (mg/kg)	DOE OB Maximum Sample Value (mg/kg)	DOE OB Suggested Maximum Background (mg/kg)
<b>Sb</b> (surface and subsurface) N/T/SW/CTF/Off	<6	3.9	NA <sup>(2)</sup>	NA	3.9
<b>As</b> (surface) N/SW/CTF/Off (subsurface) N/T/SW/Off CTF	2.5  2 2.7	5.6  4.4 7	2.5	8.4	5.6  4.4 7
<b>Ba</b> (surface) N/Off T SW/CTF (Subsurface) SW/CTF N/T/Off	100 156 59  71.7 101	200 534 130  214 336	90.5	200	200 281 130  214 200
<b>Be</b> (surface and subsurface) N/T SW/CTF/Off	0.43 0.34	0.80 0.65	<1	<1	0.80 0.65
<b>Cd</b> (surface) N/SW/CTF/Off T (subsurface) N/T/SW/CTF/Off	<0.5 1.0  <0.5	1.6 5.1  0.9	<1	<1	<1 <1  0.9
<b>Total Cr</b> (surface) N/SW/CTF/Off T (subsurface) N/CTF/Off T SW	6.3 12.35  5.7 9.10 6.4	17.3 21.8  12.8 16.2 15.9	8.0	20.0	17.3 21.8  12.8 16.2 15.9

COC (Depth) Area Group <sup>(1)</sup>	SNL Median  (mg/kg)	SNL 95th Percentile or UTL  (mg/kg)	DOE OB Median  (mg/kg)	DOE OB Maximum Sample Value (mg/kg)	DOE OB Suggested Maximum Background (mg/kg)
Cr <sup>+6</sup> (surface and subsurface) SW	<0.1	<2.5	NA	NA	1
Co (surface) N/Off T SW/CTF (subsurface) N/Off T SW/CTF	4.4 5.8 2.95 4.8 6.6 3.0	7.1 11.6 5.2 8.8 10.7 5.2	5.0	9.3	7.1 9.3 5.2 8.8 9.3 5.2
Cu (surface) N T SW/CTF/Off (subsurface) N T SW/CTF/Off	10.1 16.7 5.9 14.7 27.35 6.3	25.5 27.7 15.4 88.2 224 18.2	10.0	17	17 17 15.4 17 17 18.2
Pb (surface) N/T SW/CTF/Off (subsurface) N/T SW/Off	13.0 7.8 5.0 4.9	68 21.4 11.2 11.8	11	39	39 21.4 11.2 11.8
Hg (surface) N/T/SW/CTF/Off (subsurface) N/T/SW/CTF/Off	<0.1 <0.1	0.31 <0.1	<0.25	<0.25	<0.25 <0.1
Ni (surface and subsurface) N/Off T SW/CTF	7.0 11.5 6.0	25.4 52.5 11.5	8.0	21.0	25.4 21.0 11.5

COC (Depth) Area Group <sup>(1)</sup>	SNL Median  (mg/kg)	SNL 95th Percentile or UTL  (mg/kg)	DOE OB Median  (mg/kg)	DOE OB Maximum Sample Value (mg/kg)	DOE OB Suggested Maximum Background (mg/kg)
<b>Se</b> (Surface and subsurface) N/T/SW/CTF/Off	<1	<1	NA	NA	<1
<b>Ag</b> (surface) N/SW/CTF/Off (subsurface) N/T/SW/CTF/Off	<1  <1	2.0  <1	<1	<1	<1  <1
<b>Tl</b> (surface and subsurface) N/T/SW/CTF/Off	<0.5	<1.1	<1	2	<1.1
<b>Sn</b> (surface and subsurface) N/T/CTF/Off	<51.5	<122	<10	<10	<10
<b>Total U</b> (surface) N/T/SW/CTF/Off (subsurface) N/SW	2.2  1.25	3.42  2.3	NA	NA	3.42  2.3
<b>V</b> (surface) N/T SW/CTF/Off (subsurface) N/T SW/Off	25.0 12.1  23.75 13.8	47.2 20.4  42.8 21.5	23.0	33.0	33.0 20.4  33.0 21.5
<b>Zn</b> (surface and subsurface) N T SW/CTF/Off	33.7 44.8 22.75	82.4 117 62	32.0	76	76 76 62

COC (Depth) Area Group <sup>(1)</sup>	SNL Median  (mg/kg)	SNL 95th Percentile or UTL  (mg/kg)	DOE OB Median  (mg/kg)	DOE OB Maximum Sample Value (mg/kg)	DOE OB Suggested Maximum Background (mg/kg)
Zr (surface and subsurface) Off	5.35	9.2	NA	NA	9.2

Notes:

(1) Area Groups: N = North, T = Tijeras, SW = Southwest, CTF = Coyote Test Field, Off = Off-site

(2) NA = not analyzed

Table 2  
Radiological Constituents in Soil

COC (depth) Area Group <sup>(1)</sup>	SNL Median  (pCi/g)	SNL 95th Percentile or UTL  (pCi/g)	DOE OB Median  (pCi/g)	DOE OB Maximum Sample Value (pCi/g)	DOE OB Suggested Maximum Background (pCi/g)
<b>Cs-137</b> (surface) N/Off T SW/CTF (subsurface) N/Off SW	0.239 0.380 0.1475 0.000 0.000	0.836 0.908 0.664 0.084 0.0789	0.411	3.545	0.836 0.908 0.664 0.084 0.079
<b>Ra-226</b> (surface) N/SW (subsurface) N/SW T	0.985 0.870 0.500	2.30 1.76 0.90	1.992	3.827	2.30 1.76 0.90
<b>Ra-228</b> (surface) N SW (subsurface) N T SW	0.872 0.716 0.900 0.400 0.620	1.33 1.01 1.20 0.70 0.93	NA <sup>(2)</sup>	NA	1.33 1.01 1.20 0.70 0.93
<b>Sr-90</b> (surface) N/T/SW/Off	0.29	1.98	NA	NA	1.08
<b>Th-232</b> (surface and subsurface) N SW/Off	0.970 0.718	1.54 1.01	0.980	1.540	1.54 1.01
<b>Th-234</b> (surface and subsurface) N/SW	<1.48	1.4	NA	NA	1.4
<b>U-234</b> (surface and subsurface) N SW	1.0 <4.72	1.6 <5.02	0.78	1.29	1.6 1.6

COC (depth) Area Group <sup>(1)</sup>	SNL Median  (pCi/g)	SNL 95th Percentile or UTL  (pCi/g)	DOE OB Median  (pCi/g)	DOE OB Maximum Sample Value (pCi/g)	DOE OB Suggested Maximum Background (pCi/g)
U-235 (surface and subsurface) N/CTF SW	0.0555 0.0448	0.18 0.16	0.06	0.12	0.18 0.16
U-238 (surface and subsurface) N/Off SW	0.835 <0.492	1.3 1.4	0.850	1.400	1.3 1.4

Notes:

- (1) Area Groups: N = North, T = Tijeras, SW = Southwest, CTF = Coyote Test Field, Off = Off-site  
(2) NA = not analyzed



**Table 3**  
**Chemical Constituents in Ground Water**

COC	EPA PQL <sup>(1)</sup>  (µg/L)	EPA Analytical Method	DOE OB Contract Lab Detection Limit <sup>(2)</sup> (µg/L)	EPA MCL <sup>(3)</sup> (µg/L)	DOE OB 95th % or UTL (µg/L)	SNL 95th % or UTL (µg/L)	DOE OB Suggested Maximum Background (µg/L)
Sb	300 30	6010 7041	50	6	NA <sup>(6)</sup>	<50	6
As	500 10	6010 7060	10	50	NA	14	14
Ba	20	6010	100	2000	200	120	120
Be	3	6010	4	4	NA	<5	4
Cd	40 1	6010 7131	0.5	5	<1	0.47	0.47
Cr total	70 10	6010 7191	1	100	31	71	43
Cr <sup>+6</sup>	70 10	6010 7191	1	100	NA	<10	<10
Co	70	6010	10	50 <sup>(5)</sup>	<10	2.5	2.5
Cu	60	6010	10	1000 <sup>(5)</sup>	<50	<50	<50
Pb	40 10	6010 7421	2	15	13	10	10
Hg	2	7470	0.2	2	NA	<5	2
Ni	50	6010	20	100	28	<60 200	28 28
Se	750 20	6010 7740	5	50	NA	5	5
Ag	70	6010	10	50	NA	<40	<10
Tl	400 10	6010 7841	5	2	NA	<4000	2
Sn	8000	7870 6010	30	----	NA	<500	50

COC	EPA PQL <sup>(1)</sup> (µg/L)	EPA Analytical Method	DOE OB Contract Lab Detection Limit <sup>(2)</sup> (µg/L)	EPA MCL <sup>(3)</sup> (µg/L)	DOE OB 95th % or UTL (µg/L)	SNL 95th % or UTL (µg/L)	DOE OB Suggested Maximum Background (µg/L)
U total	----	----	5 <sup>(4)</sup>	20 <sup>(6)</sup>	NA	5.2	5.2
V	80 40	6010 7911	10	20 <sup>(7)</sup>	13	13 4.1	13 4.1
Zn	20	6010	20	5000	2230	260 470	260 470
Zr	----	----	----	----	NA	NA	----
NO3/ NO2	----	353.2	0.1	10000	---- <sup>(9)</sup>	6000	4000

Notes:

- (1) Environmental Protection Agency (EPA) Practical Quantitation Limit (PQL), 40CFR 264 Appendix IX
- (2) Typical detection limit achieved by DOE OB contract laboratory (American Environmental Network, unless specified otherwise)
- (3) EPA Maximum Contaminant Limit
- (4) New Mexico Department of Health Scientific Laboratory Division (SLD) detection limit
- (5) New Mexico Water Quality Control Commission standard
- (6) Proposed EPA Maximum Contaminant Limit
- (7) EPA Lifetime Health Advisory
- (8) NA = not analyzed
- (9) NO3/NO2 could not be reliably established for the KAFB area on a site-wide basis (Moats and Winn, 1995)

**Table 4**  
**Radiological Constituents in Ground Water**

COC	EPA Maximum Contaminant Limit (pCi/L)	SLD Detection Limit <sup>(1)</sup> (pCi/L)	DOE OB 95th % or UTL (pCi/L)	SNL 95th % or UTL (pCi/L)	DOE OB Suggested Maximum Background (pCi/L)
Cs-137	----	40	NA <sup>(5)</sup>	9.3	9.3
Ra-226	5 <sup>(2)</sup>	0.2	NA	2.7	2.7
Ra-228	5 <sup>(2)</sup>	2	NA	4.7	4.7
Rn-222	300 <sup>(3)</sup>	20	NA	NA	300
Sr-90	----	----	NA	<1.6	<1.6
Th-232	----	0.1	NA	0.17	0.17
Th-234	----	104 <sup>(4)</sup>	NA	NA	<104
U-234	----	0.1	NA	7 18	7 18
U-235	----	0.1	NA	0.41 0.76	0.41 0.76
U-238	----	0.1	NA	3.0 7.4	3.0 7.4

Notes:

- (1) SLD = New Mexico Health Department Scientific Laboratory Division
- (2) Maximum Contaminant Limit actually applies to Radium 226 + Radium 228
- (3) Proposed EPA Maximum Contaminant Limit
- (4) DOE OB contract laboratory (American Environmental Network) detection limit
- (5) NA = not analyzed

**Table 6**  
**Canyons Study -- Radiological Constituents in Soil**

<b>COC Area Group<sup>(1)</sup></b>	<b>SNL Median</b>  (pCi/g)	<b>SNL 95th Percentile or UTL</b>  (pCi/g)	<b>DOE OB Median</b>  (pCi/g)	<b>DOE OB Maximum Sample Value</b> (pCi/g)	<b>DOE OB Suggested Maximum Background</b> (pCi/g)
<b>Cs-137</b> LC UC CB Fan	0.256 0.036 0.441 0.147	1.55 0.515 1.063 0.664	0.411	3.545	1.55 0.515 1.063 0.664
<b>Ra-226</b> UC LC/UC/Fan	1.60 1.00	2.66 2.60	1.992	3.827	2.66 2.60
<b>Ra-228</b> LC/UC/Fan	0.714	1.080	NA <sup>(2)</sup>	NA	1.080
<b>Sr-90</b> LC/UC/CB Fan	NA 0.29	NA 1.98	NA	NA	1.08 1.08
<b>Th-232</b> LC/UC/Fan	0.72	1.03	0.98	1.54	1.03
<b>Th-234</b> LC/UC/Fan CB	<1.48 1.31	3.4 2.31	NA	NA	2.31 2.31
<b>U-234</b> LC/UC/Fan	<18.1	<21.4	0.780	1.290	2.31
<b>U-235</b> LC/UC/CB/Fan	<0.048	<0.391	0.06	0.12	0.16

COC Area Group <sup>(1)</sup>	SNL Median (pCi/g)	SNL 95th Percentile or UTL (pCi/g)	DOE OB Median (pCi/g)	DOE OB Maximum Sample Value (pCi/g)	DOE OB Suggested Maximum Background (pCi/g)
U-238 LC/UC/Fan	<1.74	2.31	0.850	1.400	2.31

Notes:

- (1) Area Groups: LC = Lower Canyons, UC = Upper Canyons, CB = Canyons Background; see also note (1) of Table 1  
(2) NA = not analyzed